The Canadian Entomologist.

LXXV MARCH, 1943 No. 3

# OBSERVATIONS ON THE CLOVER OR BROWN MITE, *BRYOBIA PRAETIOSA* KOCH.*

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The clover or brown mite, a common pest of cultivated plants, is frequently mentioned in the literature as occurring on orchard trees as well as on a variety of grasses and herbaceous plants. Its habit of entering dwellings at various seasons has even caused it to be included in the category of household pests. The development of the mite on apple and other fruit trees seems to be very similar throughout its range. There are usually three or four generations during the summer, and the winter is passed in the egg stage upon the limbs and spurs of the trees. On the other hand the biology of the mite when living upon legumes and various other herbaceous plants apparently has not been carefully studied. References to its life history on such hosts indicate that it may hibernate as an adult or pass the winter in the egg stage upon trees and that it frequently enters dwellings.

The following observations were made at Vernon, British Columbia, and are concerned with the habits of the clover mite infesting blue grass, clover, burdock and other low-growing plants adjacent to the insectary building. These observations indicate that two biologic races of this mite occur in British Columbia. One is apparently confined to deciduous trees and has several generations each year, whereas the other infests grasses and low-growing plants and has but one generation annually. That *Bryobia praetiosa* may be represented by two or more races is shown by Zacher (1923) who states that the race occurring on gooseberry in Germany is but single brooded, whereas forms infesting ivy and certain other plants may produce several generations each season.

Early in March 1941, an examination of the inner surface of the base boards of the insectary building at Vernon revealed quantities of debris composed of cast skins of the clover mite together with large numbers of empty egg chorions and the remains of many adult mites. This material evidently represented an accumulation of several seasons. Considerable numbers of unhatched eggs, presumably deposited during the previous season, were also found on the surface of the wood protected from the weather. The eggs of the mite have since been found in a variety of similar situations providing dry and sheltered conditions, for example, on rough wooden fence posts along grass-grown roads and in crevices in the bark of pine trees that are surrounded by grass and weeds.

Embryonic development is far advanced by the late fall, the setae and body appendages of the mite being entirely free and movable within the egg chorion at that time. Eclosion occurs in spring as soon as the nearby food plants begin to form leaves. Owing to the proximity of these plants to walls and other objects reflecting the warmth, they commence growth very shortly after the snow has melted. This may be some weeks before the eggs of the mite upon fruit trees have begun to hatch.

Prior to each moult the mites move away from the food plants and seek dry and protected situations in which they enter the quiescent stage and later cast their skins. Moulting generally takes place in the same locations where winter eggs occur, thus accounting for the accumulation of empty eggs and cast

*Contribution No. 2225, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.

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skins in favourable positions. The adults perform a similar migration prior to egg-laying.

After laying an egg, the mite covers it with particles of dust or other material. The particles are manipulated by the claws of the fore tarsi. In some cases only one pair of claws is used, but usually both pairs are employed. Folded pieces of white blotting paper placed near infested plants attracted many mites, and eggs were deposited in the folds of the paper. The mites covered these eggs with fibrous fragments from the surface of the paper.

Neither quiescent mites, moulted skins, nor eggs of the single brooded race have been found at any time upon infested plants. Herbaceous plants heavily infested with mites during April and early May were deserted by the middle of June, whereas upon nearby apple trees, a succession of generations has been noted with active mites occurring until late autumn.

## LITERATURE CITED

Zacher, F. 1923. Biologie, Wirtschaftliche Bedeutung und Bekämpfung der Spinnmilben. Verh. Deut. Ges. Angew. Ent. 3 Mitgliederversammlung, 1921. (Berlin 1922):59-64.

## CANADIAN TECHNICAL MEN ASKED TO ASSIST IN DETERMINING PESTICIDE NEEDS

The Wartime Prices and Trade Board and Agricultural Supplies Board, co-operating with the Combined Food Board of the United Nations, have requested the assistance of Canadian technical men in determining the pesticide needs of the country. Mr. L. S. McLaine, Dominion Entomologist, has been asked to act as Chairman of the Pesticides Requirements Committee set up for this purpose. The personnel of the Committee has been drawn from Science Service, of the Department of Agriculture, but is dependent on the co-operation of the technical men in both Federal and Provincial services to obtain the desired information. Some thirty men in the various provinces have been asked to prepare estimates on the materials used in different phases of control and all available information on substitute materials. Any information on requirements or suggestions for improving the method of collecting this information would be appreciated by the Committee. It is also suggested that the matter be given some thought throughout the season with a view to the preparation of similar estimates and possible further need for substitution during the present emergency.

The personnel of the Committee is as follows:

Mr. L. S. McLaine, Chairman.

Mr. G. F. Manson, Secretary.

Mr. H. G. Crawford, Division of Entomology.

Dr. C. R. Twinn, Division of Entomology.

Dr. A. G. Lochhead, Division of Bacteriology.

Dr. C. A. Mitchell, Division of Animal Pathology.

Mr. G. A. Scott, Division of Botany.

Mr. G. S. Peart (ex officio), Pesticides Administration.

Mr. A. M. W. Carter (ex officio), Director of Pesticides.

# HADENINE NOTES AND DESCRIPTIONS (PHALAENIDAE, LEIPIDOPTERA) *

BY J. McDUNNOUGH,
Ottawa, Ont.

*Scotogramma nevada* B. & McD. Basing my identification of this species on a male from Bishop, Inyo Co., Calif. which matches the figure of type in the 'Contributions' very closely, I find that the genitalia are practically identical with those of *ptilodonta* Grt., also figured in the 'Contributions' Vol. II (1) Pl. IV, fig. 14; *nevada* should be removed from its present association and placed as a race of *ptilodonta*, differing in the paler, more gray-tinted color of the primaries with rather better defined maculation. What is apparently a still paler form of the same species, but which might possibly prove to be specifically distinct, I have before me from the western border of Utah; the color of the primaries is white, with a faint tinge of ochreous through the fold and a strong peppering of smoky scaling; the maculation is obsolescent with the exception of a large blackish-outlined loop indicating the claviform; slight darker shading along the outer margin makes the terminal area appear somewhat darker than the balance of the wing. The genitalia show slight differences from those of *ptilodonta* and *nevada;* in the sacculus the finely spined costo-basal projection on the right side is distinctly more rounded and less elongate and the blunt apical projections on both sides are longer and more prominent; the cucullus is somewhat stouter. As I am uncertain whether these differences can be considered to have more than subspecific value I treat the form as another of those pale races so prevalent in Utah and propose for it the varietal name ALBESCENS var. nov. The Holotype is a male from Callao, Utah, July 29, 1941, (Knowlton & Harmston); No. 5336 in the Canadian National Collection, Ottawa.

*Scotogramma fulgora* B. & McD. This species, according to genitalia, is misplaced in the *orida* group. It shows a much closer affinity to *fervida* B. & McD. and should be placed to precede this species.

**Scotogramma fervida** var. **campestris** var. nov.

*Fervida* B. & McD. is apparently a wide-spread species throughout the Rocky Mt. region, varying considerably in size and color, judging by the material before me from numerous localities. The typical form, of which I have a male paratype and several topotypical females before me, was described from Ft. Wingate, New Mexico; it is a large form, the primaries being of an evenly suffused color varying from gray-brown to red-brown. Incidentally it might be well to note that the genitalic figure given (1912, Contrib. I (5), Pl. IV, 4) is not entirely accurate (due probably both to the position of the object on the slide and my inexperience in drawing at that time); a small weakly spiculate, costo-basal, triangular projection on the right-hand sacculus is not prominent enough and what appears in the drawing to be a pollex arising from the base of the neck is in reality a raised ridge forming the inner termination of the strongly chitinized costa and not projecting over same.

*Proxima* B. & Benj. was described as a Utah race of *fervida* (1942, Contr. V (3) 120) from material from Stockton, Vineyard and Eureka. It is characterized as 'paler, the deep brownish or reddish ground color of *S. fervida* being replaced by brownish-gray'. Besides a Eureka male paratype, I have a topotypical male from Vineyard before me, both somewhat worn; also a very fresh specimen from Richfield, Utah which shows a distinct pinkish tinge in the color of primaries, such tinge being only faintly indicated in my other two males but most likely present in better specimens; the size of the specimens is somewhat smaller than in topotypical *fervida*. This smaller, paler race, still showing a slight pinkish flush on primaries, is possibly confined to the western region

*Contribution No. 2184, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

of the State; specimens before me from the eastern section (Vernal, Green River) show more resemblance to the typical form, the primaries of one male being very strongly and evenly suffused with ruddy-brown.

In the northern portion of its area of distribution, notably in the southern sections of our prairie provinces, *fervida* assumes on the primaries a dull muddy clay-color, the maculation, although present, being rather indistinct, and the dark terminal area being frequently less in contrast to the balance of the wing-color. The size is that of *proxima* or even smaller. It is for this seemingly constant race, which in color is quite similar to *oregonica* v. *montanica* McD. that I propose the above name.

*Holotype*—♂, Swift Current, Sask., July 1, 1937; No. 5347 in the Canadian National Collection, Ottawa.

*Paratypes*—5 ♂, same locality, July 22, 28, 1938, Aug. 5, 1937, Aug. 1, 1935, (K. M. King); 1 ♂, Manyberries, Alta., July 22, 1925, (H. L. Seamans),

Other specimens before me from various localities in Wyoming, Montana and Oregon seem to belong here in wing color and male genitalia.

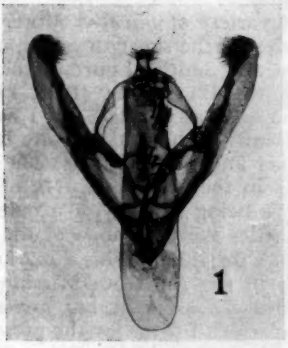
I have made a number of slides of the genitalia of males representing the various races and can point to nothing distinctive which could serve to separate these races. There is a good deal of individual variation, notably in the shape and length of the projections of the sacculus, and also in the breadth of the cucullus and the strength of the spines constituting the corona but this appears to be purely individual, as far as I can tell.

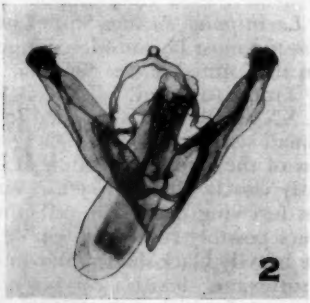
*Lacinipolia naevia* Sm. This species, placed in my Check List as a *Polia* (No. 1681) proves to be a *Lacinipolia* belonging in the *gnata* group. I surmised this after a study of a figure of the holotype and this has been kindly confirmed for me by Mr. C. Heinrich of the United States National Museum where the type is deposited. He further informs me that male specimens in the Barnes Collection under *griseata* Sm., one of which had been compared years ago by me with Smith's type at New Brunswick, N. J., are the same species; the female type, however, which is in the National Museum may represent another species. Under the circumstances, as, according to general usage, the type male in the Smith Collection will become the holotype of *griseata*, *griseata* Sm. will fall to *naevia* Sm.

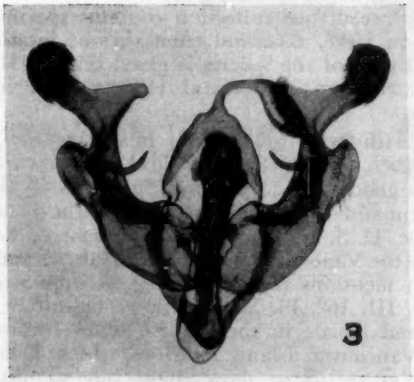
*Lacinipolia pensilis doira* Stkr. From a study of the male genitalia it is very evident that *doira*, at present placed under *vicina* Grt., is in reality a pale race of *pensilis* from Utah. These two perplexingly close species, as far as maculation goes, have quite distinctive genitalia as already partially noted by Smith in his revision (1891, Proc. U. S. N. M., XIV, 264). The best distinguishing character is not however mentioned by Smith; in *vicina* the juxta gives off two large free, triangular lateral projections, furnished on the inside with numerous spines which project slightly beyond the pointed apices of the arms; in *pensilis* these arms are replaced by two recurved spine-patches, arising from the anellus

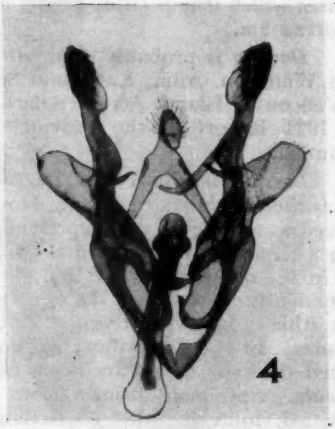
Typical *pensilis* from Vancouver Island is a rather dark species; I have already (1927, Can. Ent., LIX, 208) had occasion to mention its occurrence in the interior of British Columbia where it flies considerably later in the summer than the *vicina* race I referred to as *acutipennis* Grt. Even darker specimens occur at Truckee and Nelson Cr., Plumas Co., Calif. and these will have to be checked with the type of *acutipennis* Grt. from Nevada (unfortunately a female) to establish the correct association of this name. A series before me from Malta, and Miles City, Montana, shows a faint ruddy suffusion over most of the primaries and leads over to the typical pale gray *doira* which is apparently the predominant form in Utah. *Vicina* also occurs in this same region and great care is necessary to separate the two species; dates of capture often help, *doira* flying in September while *vicina* appears a month earlier. Certain specimens

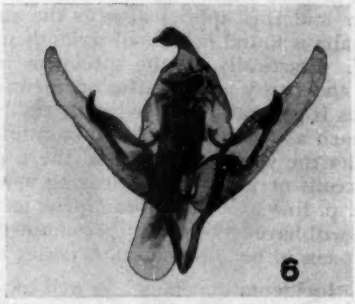
PLATE III






MALE GENITALIA OF HADENINE SPECIES

before me from the vicinity of Salt Lake City are darker and better marked than typical *doira* (*ascula* Sm.) from Stockton, although agreeing genitalically. I have seen no Arizona material of *pensilis*, all Arizona specimens before me falling to *vicina sareta* Sm.

*Lacinipolia davena* Sm. Listed as a variety of *olivacea* Morr. I believe that *davena* must be considered a good species on the strength of the male holotype in the United States National Museum and Smith's figure of the genitalia (1901, Trans. Am. Ent. Soc., XXVII, Pl. X, fig. 12). Dyar (1904, Proc. U. S. N. M., XXVII, 854) was inclined to view the slide 'as varietal', but I have before me a small series of slides which agree excellently with Smith's figure in the narrowness of the terminal portion of the clasper and the cucullus. The species is evidently closely allied to *comis*, but differs in the greater incurve of the t. p. line on forewing below the cell, this incurve being filled with a pale greenish (at times possibly ruddy) patch. In the males the basal area of the forewing is more heavily black-shaded and in both sexes the collar shows a marked, white, distal suffusion. Smith's cotypes of *davena* in the American Museum at New York, some of which I have examined, are not conspecific but *are* a form of *olivacea* which may possibly need a name but which I place for the present under *megarena* Sm.

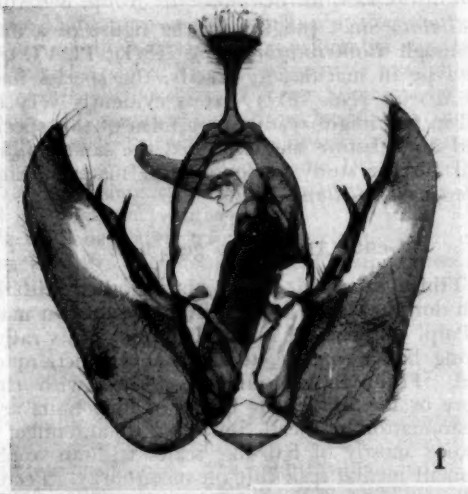
*Davena* is probably quite wide-spread; our collection contains specimens from Waterton, Alta.; Kaslo and Seton Lake, B.C. and from various localities on Vancouver Island. A rather dark figure of the species is given on Pl. III of the 1921 Report of the Provincial Museum of Natural History of British Columbia.

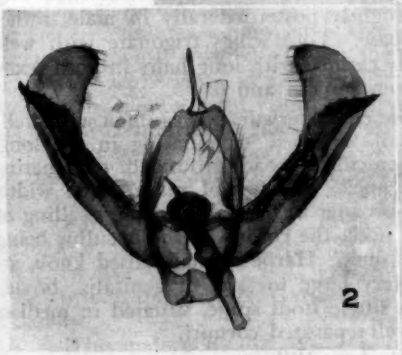
*Lacinipolia comis* Grt. I agree with Dyar (*op. cit.* 854) in sinking *obnigra* Sm. as the female sex of *comis*. However, I am inclined to think that *rectilinea* (placed as a variety) may represent a good species. It was originally described from specimens from California, Oregon and Vancouver (presumably the island) and in his revision Smith (1891, Proc. U. S. N. M., XIV, 255) seems to have pretty definitely restricted the types to the Vancouver Island specimens, although Dyar (this action evidently *ultra vires*) mentions (*op. cit.* 854) types from Sierra Nevadas. In the 'Contributions' Vol. III, 162, Pl. XII, fig. 7 we definitely restricted the type to a Vancouver Island female in the United States National Museum. Specimens from various Vancouver Island localities which I have identified, following this restriction, as *rectilinea* show slight but seemingly constant differences in the male genitalia from *comis;* the uncus, while of the same general diamond-shape (not the strap-shape of *olivacea*) is decidedly narrower and this applies also to the small finger-like harpe; a similar type of genitalia is found in a small series of specimens from Oakland and Guerneyville, Calif. Practically all the specimens in my series show, besides the rigid t. p. line, the mossy green suffusion mentioned by Smith; the pale area above the tornus is generally suffused with ruddy in the males and there is consequently not such a well-defined pale subterminal area or tornal spot as in *comis;* in the females the whole area beyond the t. p. line is frequently suffused with smoky olivaceous or mossy green, leaving a narrow white edging to the lower half of the t. p. line as a quite prominent feature. I have not seen Smith's types and these will have to be carefully examined to verify the above but in any case there does seem to be another valid species in this difficult group.

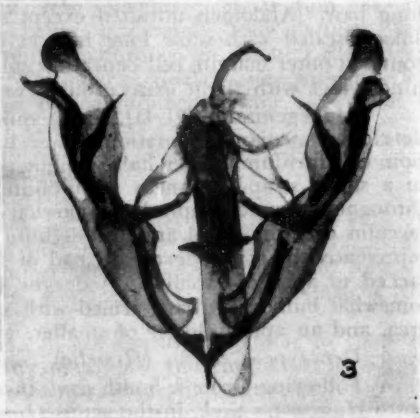
Incidentally it might be well to note that Smith in his paper on the group (*op. cit.* pp. 230-240) and also in many other descriptions refers to "Livingston" and "Corfield" as if they were localities on Vancouver Island; they are in reality names of collectors; with the Wolley-Dod Collection we received a good deal of Livingston's material, evidently collected in the regions of Victoria and Duncan; regarding Corfield's collections I have no information.

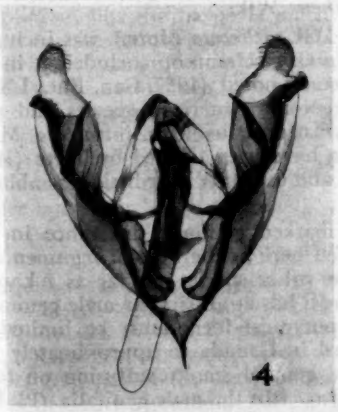
*Lacinipolia lunolacta* Sm. The species was based on two females from

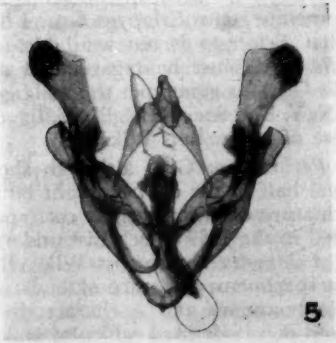
PLATE IV




MALE GENITALIA OF HADENINE SPECIES

Pullman, Wash. and Idaho. Judging from a figure before me of the type specimen the species must belong in the above group, probably quite close to *comis*. The present position in the List, in the *laudabilis* group, is hardly correct.

*Lacinipolia dilatata* Sm. Judging by the figure of a male given in the Barnes and McDunnough 'Contributions' Vol. II (1), Pl. VI, fig. 9, which purports to match the type in maculation exactly, the species has been wrongly listed in the genus *Miselia* (No. 1811). It is evidently very closely allied to *illaudabilis* Grt. and in fact might readily be a form of this species. Wolley-Dod, in some unpublished notes before me, expressed the same opinion, after seeing Smith's type. Until further study of topotypical material can be made, the name should be listed next to *illaudabilis*.

Genus **Anhimella** gen. nov.

Eyes hairy. Tibiae unarmed, basal joints clothed with long hairs, mid and hind tibiae with dorsal ridge of long hair. Antennae in male finely ciliate, in female simple. Palpi upturned, basal and second joints rather rough-scaled and fringed with long hair ventrally, third joint distinct, much longer than broad, smooth-scaled. Front flatly rounded, clothed with closely appressed hair-like scaling, more or less hidden by fringe of long hairs arising from posterior margin. Squammation of head, posterior to antennae, and of thorax rather rough, composed mostly of hair-like scales without appreciable tufting on thorax except a small medial scale-tuft on metathorax. Pectus clothed with long hair. Abdomen untufted except slightly posterolaterally in male, rather smooth-scaled with some long hair at base. Fore wings trigonate with well-rounded outer margin, cell beneath feebly clothed with long hairs in both sexes, hind wings with slight excavation between veins 4 and 6.

Male genitalia (Pl. III, fig. 1) quite characteristic. Tegumen with well-developed median articulation; lower half V-shaped, terminating in the long, pointed vinculum; upper half without peniculus, broadly rounded, terminating in a short, strap-like uncus with blunt apex. Clasper of rather even width throughout, rounded apically, somewhat broader at base, due to the swelling of sacculus over the costal area; no definite neck, the corona of the cucullus being represented by a well-developed pad of spines. Harpe a small raised knob, attached to apex of sacculus. Aedeagus very large for size of genitalia, broad, somewhat bulbous at base, armed with a single stout spine, situated in median area, and an apical cluster of smaller, well-separated cornuti.

*Genotype—Celaena* (*Himella*) *contrahens* Wlk.

Following Grote & Smith *contrahens* Wlk. (*thecata* Morr.) was included, up to Hampson's time, in the genus *Himella* Grt.; Hampson included it in his conglomerate genus *Eriopyga* Gn. I have already noted (1937, Can. Ent., LXIX, 44) that *Eriopyga* is not available for our North American species and that *Himella* Grt. must be regarded as a monobasic genus with *intractata* Morr. (*fidelis* Grt.) as genotype; the male genitalia have been figured by Tietz (1937, Jour. N. Y. Ent. Soc., XLV, Pl. 23, fig. 159A) and certainly bear little resemblance to those of *contrahens* Wlk.

*Perbrunnea* Grt., although showing marked genitalic difference in the terminal half of the clasper might be included here as the type of tegumen and the armature of the aedeagus correspond; no other species (as far as I know) included in the 1937 Check List under *Orthodes* has at all similar male genitalia.

*Anhimella contrahens* Wlk. The topotypical form must be limited to eastern specimens; this race extends westward in Canada to approximately the Ontario boundary and is characterized by a general smoky suffusion on forewing and poorly defined orbicular and reniform. In the male genitalia (Pl. III, fig. 1) there are faint traces of a pollex just beyond the minute harpe and the 10-13 terminal cornuti of the aedeagus are quite thin. From Manitoba westward

across the prairies to the Kootenay district of British Columbia (Kaslo) the color of the primaries pales considerably, especially in our Lethbridge series, and the ordinary spots are, in consequence, much more prominent; the genitalia are similar to those of the topotypical form except that the terminal cornuti (the number is variable) of the aedeagus are considerably stouter. For this race the name *infidelis* Dyar, based on Kaslo specimens is available, but I believe the name can quite profitably be sunk to *conar* Stkr. (*quadristigma* Sm.) as was done by Hampson. These two names are based on Utah and New Mexico specimens and, with the best of will, I cannot see any character of either color or maculation on which to separate our Kaslo and Utah (Provo, Eureka) series; in the genitalia Utah specimens seem to lack all trace of an incipient pollex but this to my mind is an extremely minor point.

In the Pacific Coast area a form has arisen, which, while in maculation practically identical with *contrahens,* shows in male genitalia certain characteristics which would seem to indicate a good species or at all events a distinct race. I treat it for the present as a species.

### **Anhimella pacifica** n. sp.

*Eriopygia infidelis* McD. (*nec* Dyar) 1927, Can. Ent., LIX, 209.

Primaries slighly darker in color than typical *contrahens* and very decidedly darker than *infidelis* and *conar,* being a rather even dark brown with possibly a slight purplish cast, the contrasting light ochreous areas of *contrahens* below apex being much less obvious. Maculation as in *contrahens,* the crosslines and spots being moderately well defined, the former frequently with pale filling, the reniform outlined on its outer edge quite noticeably wit'. white as in *infidelis.* Secondaries dirty white, with heavier smoky shading terminally and a curved dotted postmedian line as well as a slightly broken terminal line. Size as in *contrahens.*

*Holotype*— ♂, Seton Lake, B.C., July 4, 1926, (J. McDunnough); No. 5327 in the Canadian National Collection, Ottawa.

*Allotype*— ♀, same data, June 14.

*Paratypes*—6 ♂, 14 ♀, same data, various dates from June 2—July 14, 1926; 1 ♂, 3 ♀, same data, July 22, Aug. 6, 9, 12, 1933; 1 ♂, Lillooet, B.C., July 1927, (A. W. A. Phair); 3 ♂, 1 ♀, Summerland, B. C., Aug. 10, 1930, June 29, 1931, July 9, 1935, (A. N. Gartrell); 1 ♀, Keremeos, B.C., July 27, 1923, (C. B. Garrett).

The male genitalia (Pl. III, fig. 2) are essentially similar to those of *contrahens,* but the harpe is much better developed and consists of a distinct, rather broad, bluntly rounded tubercle, faintly setose; it is situated noticeably closer to the cucullus than that of *contrahens;* there is no trace of a pollex. The spines of the corona are stronger and more numerous than in the allied species.

The species extends for a considerable distance down the coastal area; a few specimens before me from Yakima, Wash., and Kelseyville, Calif., show the same type of genitalia but differ considerably in the depth of coloration of the primaries; good races may be indicated but until more material is available I prefer not to deal with them.

## Genus **Pseudorthodes** Morr.

*Pseudorthodes* Morrison, 1874, Can. Ent. VI, 253 (genotype, *Orthodes vecors* Gn.).

There seems to be sufficient justification in the different type of male genitalia, (Pl. IV, fig. 2) palpal vestiture, lack of strong sexual scaling in male, etc., to separate this genus from *Orthodes* Gn. The characters of the genotype, *vecors* Gn., have been well defined by Tietz (1937, *op. cit.* 92, figs. 128—131); his figure of the genitalia (131A) is a little misleading as to the position of the harpes which normally lie flat on the clasper and project over the ventral margin. *Calceolaria* Stkr., *imora* Stkr. and *keela* Sm., species unknown to me, may also

be included. *Irrorata* Sm., *puerilis* Grt. and *virgula* Grt., fit nicely into the genus; they form a compact little group which agrees with *vecors* in palpal and antennal characters and in the clothing of the cell underneath; the genitalia also are not dissimilar, the main difference being in the less prominent harpes.

### Genus **Orthodes** Gn.

As I have already indicated (1937, Can. Ent. LXIX, 44) this genus must apparently be restricted to the small group of species related to the gentoype, *infirma* Gn. This includes *jamaicensis* Hamp. (1905, Cat. Lep. Phal. V, 321) and our North American *crenulata* Butl. All three species show the small triangular black patch at base of tegulae dorsally and the long, down-turned hairs on the underside of primaries in the cell. The two latter show, further, in the male sex, costal fringes of hair on underside of both wings and strong abdominal terminal tufting. The genitalia of *infirma* and *crenulata* are of the same general type and I presume that those of *jamaicensis*, when available for study, will be found very similar. The genus may be characterized as follows: Palpi with second joint clothed with closely appressed scaling and with scarcely any indication of ventral fringe of hair; third joint distinct, smooth scaled, of variable length, typically rather stubby. Male antennae finely ciliate. Thoracic vestiture consisting largely of scales with some admixture of hair, rather closely appressed, especially on collar, and showing no definite tufting. In the male the fore femora possess a strong specialized scale-tuft, and tufts of long hair arise from the bases of all pairs of legs; other specialized tufts of very long hair and scales arise from the base of the genitalia. In these organs (Pl. IV, fig. 1) the claspers are rather weakly chitinized, very broad at base and gradually tapering to a blunt apex with no differentiation into sections; corona lacking, apex being merely clothed with long hair; from the mid-section of costa two small, free, chitinous arms arise (probably representing the harpe) one behind the other, the proximal one with forked apex. Uncus with narrow neck, expanded apically, vinculum rounded.

Along with the above mentioned species and one other new one which I describe below, I associate *cynica* Gn. for the present. This species shows, at least, similarity with *crenulata* in type of maculation and tendency to specialized tufting in the male, and there are certain characteristics in the male genitalia (position of harpe, type of uncus and vinculum, etc.) which would seem to indicate some rather remote connection with the typical *Orthodes* group of species.

### **Orthodes furtiva** n. sp.

*Male.* Palpi blackish outwardly, ochreous inwardly and beneath; third joint rather long and pointed. Antennae finely ciliate. Head and thoracic vestiture deep purple- brown, with faint springling of white scales. Abdomen smooth-scaled, smoky. Primaries purple-brown. Basal half line represented by some obscure black marks. T. a. line single, black, rather regularly outwardly oblique, preceded on cubitus and vein 1 by black dots, followed on costa by small whitish patch. Median shade broad, blackish, rather irregular, in general parallel to t. a. line and crossing base of reniform to submedian fold, then bent inward to inner margin where it touches t. a. line. T. p. line rather indistinct, single, black, outwardly oblique from costa to vein 6, then directed inwardly, rather rigid and passing near base of reniform; beyond and parallel to it a series of black dots on veins 1–6 and beyond this again fainter small black dashes on veins, separated from dots by slight white scaling. A pale patch on costa beyond t. p. line and some dark shading in space between reniform and t. p. line. Orbicular and reniform large, outlined in pale ochreous with a fine inner border of black and with slight central whitish scaling, especially in reniform; orbicular obliquely lunate, reniform broad, upright, the two spots almost touching at their

bases. Claviform not indicated. S. t. line pale ochreous, faintly margined with blackish, rather even in course and parallel to outer margin. Veins terminally, and cubitus below cell intermittently white-sprinkled. Faint terminal row of dark dots. Fringes concolorous. Secondaries deep smoky with paler fringes. Beneath light smoky-ochreous with a pinkish tinge; long hairs in cell of primaries very weakly represented; broad, curving, blackish, postmedian line crossing both wings and a distinct dark discal dot on secondaries.

*Female.* Very similar to male, in general deeper in color either in the median space alone (allotype) or over the entire wing (paratype). In the latter case the t. a. and t. p. lines show an inner and outer pale edging respectively. The orbicular is more evenly oval and the reniform more lunate than in the male holotype (probably individual variation). Expanse 27 mm.

*Holotype*—♂, Brownsville, Tex., Mar. 7, 1937, (T. N. Freeman); No. 5346 in the Canadian National Collection, Ottawa, Ont.

*Allotype*—♀, same data, Mar. 10.

*Paratype*--1 ♀, same data, Jan. 20.

Evidently allied to *infirma* Gn. but differing, according to Hampson's description, in possessing evenly dark smoky hind wings. It lacks the heavy fringes of hair along the costa of male fore wings beneath found in *jamaicensis* Hamp. The male genitalia are of a similar type to those of *crenulata* but much smaller and the sacculus is not nearly so broadened at base; the juxta, instead of being shield-shaped with concave apical margin, shows a club-shaped apical projection.

With the genus *Orthodes* Gn. limited as above some new generic terms are apparently necessary to take care of the balance of the species at present included; the genitalia offer considerable help in the correct grouping of these species.

## Genus **Protorthodes** gen. nov.

Eyes hairy. Male antennae bipectinate or serrate and fasciculate. Palpi rather smooth-scaled, second joint with only indications of fringe of long hair ventrally; third joint rather short and stubby, smooth. Vestiture of head and thorax somewhat roughened, composed largely of fine, apically-forked scales; thoracic tufting improminent, with indications of metathoracic median tuft. Abdomen smooth-scaled, with no lateral hair-tufting but with long hair terminally. Pectus and bases of legs clothed with long hairs. Primaries beneath with practically no indication in either sex of the long hairs of *Orthodes*. In the male genitalia (Pl. IV, fig. 3) the uncus is thin, curved and terminates in a small dorsal hook. A well developed peniculus is present and the vinculum is drawn out to a long, pointed V. Clasper of moderate width, with well developed sacculus, the costo-basal edge of which is strongly concave; beyond sacculus the central portion of clasper shows a costal bulge and forms a concavity in which the strong, obliquely-directed harpe lies, generally projecting beyond the costal margin. Cucullus short and chunky with neck hardly differentiated, rounded apically, and covered with a corona composed of numerous moderately strong spines. At base of cucullus a strong, chunky pollex, of varying shape apically, projects over the ventral margin of clasper. Juxta strong, composed of a triangular basal plate produced apically into a long, ridged, truncated bar of chitin. Aedeagus with single strong apical spine, curved in general downward.

*Genotype—Taeniocampa curtica* Sm.

Besides *curtica* and its race *bostura* Sm. the typical section of the genus includes *utahensis* Sm., *akalus* Stkr., *eureka* B. & Benj., *daviesi* B. & Benj., *indra* Sm., *incincta* Morr. and presumably its close ally, *saturnus* Stkr. and a new species described below; in all these the genitalia are extremely closely allied. Also included are *perforata* Grt., *rufula* Sm., *antennata* B. & McD. and the more remote *alfkeni* Grt., *texana* Sm. with its race *consors* Sm. and presumably

*variabilis* B. & McD. of which I have no material. All these show the same general type of male genitalia as is found in *curtica;* the last three species differ in the weak or absent hairing of the eyes and the more strongly scaly vestiture of thorax but genitalically fit in well. Finally, for lack of a better place to put them, I leave here *oviduca* Gn. and the allied *melanopis* Hamp. with possibly *orobia* Harv., the genitalia of which I do not know. The first two species show obvious genitalic relationship with each other but have nothing much in common with *curtica,* lacking the peniculus and pollex among other things; as a matter of fact they are closest in a general way to *Hyperepia pi* B. & L., although I would hardly advocate such a transfer. Owing to a general superficial similarity in maculation and vestiture the association with *curtica* seems, for the present, the best.

**Protorthodes argentoppida** n. sp.

Male antennae serrate and fasciculate. Palpi very pale buff with slight admixture of smoky scaling. Thoracic vestiture composed mostly of hair-like scales, roughened, pale whitish-buff mixed with black streaking, especially on the patagia. Fore wing narrow, whitish-gray (or dirty white) with a considerable admixture of smoky scaling especially in the median area which thus stands out from the paler basal area and the still paler subterminal and terminal areas. *A prominent black basal streak* above the fold, not quite attaining t. a. line; this line obscurely geminate, upright, best defined in the central portion of the wing by a black loop to which the small black loop-like claviform is attached. Beyond claviform a fine black streak extending to median shade. Orbicular and reniform small, pale, improminent, partially outlined in black, the former obliquely oval, the latter not noticeably constricted and more or less open above and below. An obscure, broad, median shade from mid-costa crosses lower portion of reniform and then runs parallel and close to t. p. line to inner margin. T. p. line black, crenulate, single, squarely and broadly exserted around cell and with slight incurve in fold, followed by a narrow pale shade scarcely paler than the subterminal area. S. t. line obsolete, only marked in costal area by faint, dark spots; *a fine black streak,* crossing the t. p. line, connects the mid-outer edge of reniform with the lowest of these dark marks; traces of a similar parallel streak above vein 4. A fine, broken black terminal line. Fringes checkered with smoky. Secondaries *pure white* with a faint smoky terminal line. Beneath whitish; primaries with traces of postmedian line at costa; secondaries slightly sprinkled with smoky along costa and with a small dark discal dot. Expanse 29 mm.

*Holotype*— ♂, Silver City, N. M., June 15, 1913, (J. B. Wallis); No. 5323 in the Canadian National Collection, Ottawa, Ont.

*Paratype*— ♂, same data, June 13.

Belongs in the utahenis group according to genitalia (Pl. IV, fig. 4) which resemble those of *incincta* Morr. very closely, differing only in the less prominent projection of the pollex and the lack of a costal projection in the sacculus. In other respects the species is very dissimilar to anything in the group and shows more resemblance to the *gnata* group of *Lacinipolia;* it should be readily recognized by the narrow, grayish primaries with prominent, black, basal streak and the immaculate, white secondaries. The specimens have been in the collection for a long time but I have never been able to find a name for them.

*Protorthodes saturnus* Stkr. From information kindly supplied by Mr. Wm. Gerhard of the Field Museum, Chicago, included in some unpublished notes by F. H. Benjamin on Strecker's type, it would appear that *saturnus* belongs in the *utahensis* group and is probably closely allied to, if not the same species as, *incincta* Morr., described from the same general region. Its position in the Check List should therefore be changed.

A second large group of species which show obvious genitalic relationship centres around *furfurata* Grt.

## Genus **Homorthodes** gen. nov.

Very similar in general squammation to *Protorthodes;* the vestiture of thorax varies somewhat from the typical fine, forked scales (genotype) to on the one hand hair-like scales (*communis* Dyar) and on the other to broad scaling (*hanhami* B. & McD.). Third joint of palpi may be either stubby or long and thin. Differs from *Prothorthodes* in the character of the male antennae which are finely ciliate; also in the male genitalia (Pl. III, fig. 3) which are as follows: Uncus generally with diamond-shaped apical enlargement and a medio-dorsal ridge, occasionally strap-shaped (*fractura* Sm.) Tegumen without peniculus, upper half rather narrow and high. Clasper with well-developed sacculus, the costal edge of which is generally bulging; central portion rather narrow with a ventral chitinous projection (rarely lacking) furnished with a brush of hairs; apical portion generally bent outward, with or without a defined neck, the cucullus rounded with strong corona composed of a tuft of bristles; the most constant feature is a smooth, irregular shaped chitinous projection on costal side, arising from base of cucullus and directed inward. Harpe a curved hook projecting over costal edge of clasper. Juxta weak. Aedeagus thin, somewhat curved and variously armed. Vinculum generally broad and rounded apically.

*Genotype—Himella* (*Taeniocampa*) *furfurata* Grt.

Besides *furfurata* I include in the genus *communis* Dyar, *fractura* Sm. and presumably *smithi* Dyar which I do not know. Also *discreta* B. & McD., *dubia* B. & McD., *mania* Stkr., *hanhami* B. & McD., *reliqua* Sm. (*gracea* Sperry), *rectiflava* Sm. and probably *flosca* Sm., the genitalia of which I have been unable to examine, and finally several undescribed species, the descriptions of which are appended below. In all of these the genitalia, while naturally divergent, show a relationship either by the presence of the medioventral haired projection of the clasper or the costo-apical one or both.

*Homorthodes gracea* Sperry. I have recently received a worn male of this species from Mr. Sperry from which I have been enabled to make a genitalic slide. At the time of description the species, based on females only, was doubtfully placed at my suggestion in *Lacinipolia;* the male genitalia show conclusively, however, that the species is an *Orthodes* fitting in excellently in the *mania-furfurata* group with which the ciliate male antennae would also ally it.

I have a rather strong suspicion that *gracea* may have to fall to *reliqua* Sm., a species unknown to me except through Hampson's obviously very poor figure. Smith's original description, however, points very strongly in this direction.

### **Homorthodes perturba** n. sp.

Practically identical in size, color, and maculation with *dubia* B. & McD. but differing radically in male genitalia. The dentations of the t. p. line are possibly slightly more prominent than in *dubia* and in the two specimens before me there is no trace of the two dark streaks before the s. t. line opposite cell; the broken dark terminal line found in *dubia* is much weaker in the present species and my holotype specimen shows a continuous pale ochreous line at base of the dark fringes; in the paratype, however, this line is broken and less prominent. The genitalia (Pl. III, fig. 4) are quite similar to those of *mania* Stkr. with strong, hairy projection from clasper at middle, long neck and heavily spined cucullus, rounded apically; the small harpe projects at right angles to costal margin of clasper and the aedeagus is armed with a short cornutus. In *dubia* (Pl. III, fig. 5) the relationship to *mania* is scarcely obvious; the clasper shows a very feeble haired projection, beyond which the sides are parallel and drawn out to a ventral point apically, the poorly defined cucullus being very weakly spined; the harpe is placed more or less parallel to the sides of clasper with only a slight apical outward bend; the armature of the aedeagus consists of a long, strong spine.

*Holotype*— ♂, Huachuca Mts., Cochise Co., Ariz., May 26, 1910, (V. L. Clemence) (*ex* Coll. Wolley-Dod); No. 5324 in the Canadian National Collection, Ottawa, Ont.

*Paratype*— ♂, White Mts., Ariz., June 26, 1935, (G. & J. Sperry).

**Homorthodes rubritincta** n. sp.

Palpi pale ochreous, heavily suffused outwardly with black, third joint smooth, long. Vestiture of head and thorax largely scaly, light pinkish with slight black sprinkling on patagia. Abdomen smoky. *Primaries deep pinkish* over a light ochreous ground, this color only showing slightly on veins and above inner margin. Costa alternately checkered with pink and black spots, with large, smoky, rectangular patch at base, extending inward to cubitus. T. a. and t. p. lines vague, only slightly indicated by black scaling; t. a. line geminate, irregular, in general outwardly oblique; t. p. line single, black, sharply dentate with white points at apex of dentations, well-rounded opposite cell and then slightly incurved to inner margin. Median shade indicated by an oblique shade from costa to reniform but otherwise obsolescent. Orbicular small, round, very obscure, outline slightly indicated by black scales; reniform upright, bordered by black line most prominent laterally, lower portion filled with smoky and with a *small, but distinct white spot* on outer edge; claviform absent. S. t. line pale pinkish, rather well defined by smoky internal streaks and shading, the most prominent being *two triangular streaks opposite cell.* Terminal area slightly suffused with smoky; a distinct, broken, black, terminal line. Fringes with basal half smoky, terminal area pinkish; a distinct pale ochreous basal line. Secondaries deep smoky. Fringes light smoky, paling outwardly, with ochreous basal line as on primaries. Beneath primaries smoky, tinged with pink along costa and on fringes; a dark postmedian line, best defined in costal area, and dark terminal line. Secondaries with basal area to postmedian dark line, whitish, sprinkled lightly with smoky along costa; terminal area deep smoky, paling towards inner angle; a prominent dark discal dot. Expanse 27 mm.

*Holotype*— ♀, Maricopa, Ariz., Oct.; No. 5325 in the Canadian National Collection, Ottawa, Ont.

The species obviously belongs in the *mania* group with essentially the same maculation, including the white dot on reniform and the two subterminal dark dashes opposite cell. The pinkish coloration is distinctive.

**Homorthodes carneola** n. sp.

Closely allied to *hanhami* B. & McD. both in maculation and genitalic characters.

Thoracic vestiture as in *hanhami* but with possibly more smoky suffusion over the patagia. Color of primaries much the same shade of carneous brown and with essentially the same type of maculation; the heavy median shade of *hanhami* is, however, lacking and the terminal area is not darker but concolorous with the rest of the wing. The small round orbicular is slightly better defined, being outlined in black and with a central dark dot; the white dot on the reniform is obsolescent; the s. t. line shows small dark internal dashes in the area between veins 3 and 6. The male genitalia (Pl. IV, fig. 5) are as a whole, smaller than those of *hanhami*, the uncus narrower, the harpe much shorter and weaker and the apex of clasper somewhat differently shaped. Expanse 28-30 mm.

*Holotype*— ♂, Provo, Utah, June 9, 1910, (T. Spalding) (*ex* Coll. Wolley-Dod); No. 5326 in the Canadian National Collection, Ottawa, Ont.

*Allotype*— ♀, same data, July 4.

*Paratypes*—1 ♂, 1 ♀, same data as Allotype; 1 ♀, Eureka, Utah, July 26, 1911, (T. Spalding;) 1 ♂, Salmon Arm, B.C., June 10, 1915, (W. R. Buckell).

The British Columbia paratype shows a smokier brown color on primaries but agrees genitalically.

With the removal of the above two groups from the old dumping-ground *Orthodes* we are still left with a considerable balance of species, largely from the southwestern states, which do not fit at all well into either of these groups. Of the fourteen remaining species I have been unable to examine the genitalia of eight (viz., *jocosa* B. & McD., *trifascia* Sm., *agrotiformis* Grt., *euxoiformis* B. & McD., *alamosa* Barnes, *hueco* Barnes, *bolteri* Sm. and *gigantoides* B. & McD.). Of those examined I find that *accurata* Hy. Edw. is quite aberrant and will probably need a new generic term; *senatoria* Sm. seems closest in genitalia to *Mimobarathra* B. & McD.; *serrata* Sm. and *inconspicua* Sm. (with probably *jocosa* B. & McD.) are obviously related; *planalis* Grt. also shows certain similarities to this group in genitalia while *catalina* B. & McD. is considerably further removed, and has possibly more resemblance to *Trichofeltia* McD. than to anything else.

Until more material for study is available, I prefer for the present to lump this decidedly heterogeneous assemblage under the following single generic head.

Genus **Hexorthodes** gen. nov.

Eyes hairy. Male antennae serrate and fasciculate or bipectinate. Palpi rather chunky with short third joint; second joint heavily and rather roughly clothed with scales and with moderately strong ventral fringe of hair. Thoracic vestiture rather rough, scaly, with weak anterior and stronger posterior crests. Abdomen smooth-scaled with weak lateral hair-tufts and a small median crest on first segment. Pectus and base of legs hairy. Primaries with scattered clothing of long hair in cell underside in both sexes. Male genitalia (Pl. III, fig. 6) small, with short, broad uncus, furnished with dorsal ridge. Tegumen with upper half weak, conical, without peniculus. Vinculum long, narrowly V-shaped. Claspers short, of nearly even width throughout; sacculus weak and confined to basal third; apex of clasper slightly narrowed and cucullus clothed with long, sparse hair without a definite corona. Harpe prominent, short, broad and scoop-shaped, with upturned apex, connected to sacculus by chitinous rod at base. Juxta weak, broadly triangular. Aedeagus very large as compared with the balance of the genitalia, variably furnished apically with thorns and spines.

*Genotype—Trichopolia serrata* Sm.

*Xylomyges peritalis* Sm. Judging by Smith's remarks in his revision of the genus (1892, Proc. U. S. N. M. XV, 66, 69) where *peritalis*, based on a single Colorado male, is compared to *hiemalis* Grt. and again (*op. cit.* p. 70) under *crucialis* Harv. where he mentions a series of Colorado specimens of this species with distinguishing characters, it would seem as if the current placing of *peritalis* as a Coloradan race of *crucialis* were incorrect; in all probability it should be transferred to *simplex* Wlk. as a race of this species. The figure in the Barnes and McDunnough 'Contributions' Vol. II (1) Pl. VII, fig. 16, of a Glenwood Spgs. Colorado specimen purporting to agree with the type of *peritalis* as well as Hampson's rather exaggerated and highly colored figure under this name in his 'Catalogue' Vol. V, Pl. 89, fig. 13 point in this same direction. Both species apparently fly together in both Colorado and Utah, judging by our material, but the *simpex* form seems the rarer. The mix-up between the two species, *simplex* and *crucialis*, was satisfactorily cleared up by Wolley-Dod (1916, Can. Ent., XLVIII, 367) but the exact status of *peritalis* cannot be definitely established until after the war when it may be possible to examine again the type in the United States National Museum.

**Orthosia johnstoni** n. sp.

Allied, according to genitalia to *puncticostata* Dyar, being of about the same size and having the same type of pectinate male antennae and rough, hairy, thoracic squammation. Primaries show a slightly sharper inward angle at vein 3 on outer margin than in *puncticostata* and are somewhat narrower. Vestiture

of head and thorax pinkish gray (or smoky gray). Primaries rather deep ruddy brown with obsolescent maculation. Basal line indicated by a black dot on costa and another on cubital vein. T. a. line very faint, single, blackish, arising from a dark spot on costa, weakly outwardly oblique to submedian fold where it is accentuated by another dark dot, then angles slightly inwardly and proceeds, almost upright, to inner margin. A dark, oblique streak from costa indicates the median shade; this is elsewhere obsolescent but, as far as can be told, it apparently touches the lower inner edge of reniform and then is upright to inner margin. Orbicular and claviform absent, reniform indicated by an upright dark streak, representing the outer margin, and a slight patch of dark scaling at its base inwardly. A dark spot above reniform on costa appears to indicate the inception of the t. p. line which is otherwise only marked by small black dots on veins 1–7, parallel to outer margin and well beyond reniform. S. t. line indicated by a dark streak from costa before apex. Faint blackish intravenular dots just inside outer margin. Fringes concolorous. Secondaries smoky with pale pinkish fringes. Beneath sprinkled with smoky over a dirty white ground-color. A dark postmedian line indicated on both wings, resolved into dots on secondaries. Weak dark discal dots on all wings and terminal spotting as above. Expanse 30 mm.

*Holotype*– ♂, Mt. St. Helena, Napa Co., Calif., Mar. 24, 1939, (E. C. Johnston); No. 5351 in the Canadian National Collection, Ottawa, Ont.

*Paratype*– ♂, same data.

The genitalia are as a whole smaller than those of *puncticostata;* the clasper is narrower and much more pointed apically; the sacculus is weaker and less produced over costa and the harpe and pollex are considerably reduced in size, especially the former. The apical thorn in the vesica is weaker and shorter.

I take much pleasure in naming the species for the collector, Mr. E. C. Johnston, who has furnished me with so much interesting material from the Pacific Coast.

*Leucania scirpicola* Gn. *Pendens* Sm. will apparently have to be added to the synonymy of this species, judging by a photograph of the female type and a Florida specimen in our collection which agrees excellently with this figure. At all events it is the same thing as *calpota* Sm. as figured in the Barnes and McDunnough 'Contributions,' Vol. II (1), Pl. VII, fig. 5 and this opinion was evidently shared by Smith who has a note below the type of *pendens* stating '*Leucania pendens* is probably *calpota*'. Besides a male paratype of *calpota* we have another male from Agricultural College, Mississippi in the collection; regarding *scirpicola* Gn. I am presupposing that the note in the 'Contributions' (1914, Vol. II (5) 198) is correct.

*Leucania anteroclara* Sm. After studying the male genitalia of this species and of *farcta* Grt., I incline to the opinion expressed by Wolley-Dod (1913, Can. Ent., XLV, 64) that *anteroclara* is probably only a dark race of *farcta;* apart from some very minor differences there is nothing to distinguish the genitalia of typical *farcta* from the San Francisco, Calif. region from typical *anteroclara* from Calgary, Alta. In general *anteroclara* shows a much stronger dark streak below the cubital vein of primaries but this is not always constant, as noted by Dod; a series before me from Utah, besides showing in some individuals a faint pinkish tinge, is intermediate between the two in other respects. A few specimens from Seton Lake, B. C. which I recorded (1927, Can. Ent. LIX, 209) under *anteroclara* could just as well go as *farcta,* it being noted that the normal variety in both interior British Columbia and Vancouver Island is the pink-tinged *roseola* Sm., described from a single male from British Columbia (no further locality). *Calgariana* Sm. is certainly only the rosy form of *anteroclara* and bears the same relation to it that *roseola* does to *farcta,* except that in the latter case *roseola* can probably be given racial status.

*Leucania humidicola* Gn. This species should be added to our lists. A

long series before me from Brownsville, Tex., has been kindly identified from me as this species by J. F. Gates Clarke of the U. S. National Museum. The species is allied to *juncicola* Gn.

*Leucania rubripallens* Sm. In the Check List *rubripallens* is listed as a species; the name was based on material from Glenwood Spgs., Colo. (type locality) and other specimens from Utah and California. A small series of specimens before me from Utah seem to be undoubtedly *rubipallens* and agrees well with the figure in the Barnes and McDunnough 'Contributions', Vol. II (1), Pl. VII, fig. 2. The male genitalia are identical with those of the normally colored *minorata* Sm. which occurs in the same region and is widespread over most of the western states and provinces; to my mind *rubripallens* should be listed as a mere color-form of *minorata*, apparently not uncommon in the western Rocky Mt. area.

EXPLANATIONS OF PLATES III AND IV

PLATE III

Male Genitalia of:
1. *Anhimella contrahens* Wlk. Trenton, Ont.
2. *Anhimella pacifica* n. sp. Seton Lake, B. C. (Paratype).
3. *Homorthodes furfurata* Grt. Chelsea, Que.
4. *Homorthodes perturba* n. sp. Huachuca Mts. Ariz. (Holotype).
5. *Homorthodes dubia* B. & McD. Arizona.
6. *Hexorthodes serrata* Sm. Brownsville, Tex.

PLATE IV

Male Genitalia of:
1. *Pseudorthodes vecors* Gn. Irvington, N. J.
2. *Orthodes crenulata* Patl. Pittsburgh, Pa
3. *Protorthodes curtica* Sm. Truckee, Calif.
4. *Protorthodes argentoppida* n. sp. Silver City, N. M. (Paratype).
5. *Homorthodes carneola* n. sp. Provo, Utah (Holotype).

## *SYMPETRUM INTERNUM*, NEW NAME FOR *SYMPETRUM DECISUM* AUCT., NEC HAGEN (ODONATA, LIBELLULIDAE)

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In the course of an examination of types and other specimens of Odonata in the Hagen Collection*, in the preparation of a synonymic list of the Odonata of the Nearctic Region, I found that *Diplax decisa* Hagen, 1874, is a synonym of *Diplax* [*Sympetrum*] *obtrusa* Hagen, 1867. This synonymy was suggested by Hagen (1875) and Calvert (Currie, 1905†) and was generally accepted until the name *decisum* was revived by Ris (1911) for a species rather widely distributed in the North and West which he thought fit Hagen's description of that species. However, all the specimens of the type series of *decisum* are typical *obtrusum*, and the unfortunate phrase in Hagen's description, "veins reddish, the costa and some transversals near the base yellowish", which probably led Ris to apply the name *decisum* to the species since known by that name, does not fit them. Furthermore the species called *decisum* by Ris (1911) and later authors is really the species referred to by Hagen (1875, p. 79) under the nomen nudum, *Diplax interna*. Most of the specimens cited by Hagen under this name were found in the Museum of Comparative Zoology under the manuscript name "[*Diplax*] *interna*".

*The study of material in the Hagen Collection was supported, in part, by a Grant-in-Aid of Research by the Society of Sigma Xi.

†Currie, 1905, Proc. Ent. Soc. Wash., 7:19.

I am now proposing *Sympetrum internum* as a new name for this species, and designating the specimens which I found under the manuscript name *interna* in the Museum of Comparative Zoology as types. It seems proper to use Hagen's name for the species as he had recognized it as distinct and had also suggested that *decisum* and *obtrusum* were conspecific. It also seems proper to select Hagen's specimens as types as the diagnostic characters and the descriptions given by Ris (1911: 682, 684-685, 688) and Williamson (1933: 1-5) fit them well. (There is a distinct advantage in having types located in the same collection as those of several other North American species of *Sympetrum* described by Hagen). The characteristic cherry red color of the face in living, fully adult individuals of this species has faded from these type specimens, but other color and structural characters described and illustrated by Williamson (1933: 1-5; fig. 2, 4) fit them perfectly—golden-red wing venation; wings clear except golden yellow at base in females; male hamule bifid for about one-fourth of its length, spur-like inner branch slightly longer than outer branch, posterior edge of mesal face of outer branch bicuspidate; apices of vulvar lamina of female widely divaricate, not directed dorsad.

The synonymy of the species may be given as follows:

### Sympetrum obtrusum (Hagen)

*Diplax obtrusa* Hagen, 1867, Stett, Ent. Zeit., *28*:95.
*Diplax decisa* Hagen, 1874, Hayden, Rpt. U. S. Geol. Surv. Terr., 7:588-590.

### Sympetrum internum nomen novum

*Diplax interna* Hagen, 1875, Proc. Boston Soc., *18*:79 (nomen nudum).

*Sympetrum rubicundulum decisum* Ris, 1911, Coll. de Selys, *13*:682, 684-685, 688; Walker, 1912, Can. Ent., *44*:264-265; Ris, 1916, Coll. de Selys, *16*:1187; Kennedy, 1917, Proc. U. S. Nat. Mus., *52*:614, 617, 621, 634; Walker, 1917, Can. Ent., *49*:409-410, 412, 416, 417; Whitehouse, 1917, Can. Ent., *49*:102; Wlaker, 1918, Can. Ent., *50*:4; Whitehouse, 1918, Can. Ent., *50*:100, 1918, Drfs. Alta. (Alta. N. H. Soc.):2, 14-15.

*Sympetrum obtrusum* var. *decisum* Kennedy, 1915, Proc. U. S. Nat. Mus., *49*:329-331, 337, 345.

*Sympetrum decisum* Williamson, 1917, Mich. Mus. Zool. Misc. Publ., *2*:11; Kennedy, 1918, kans. Univ. Bull., *18*:133; Walker, 1923, Can. Ent., *55*:7, 12; Hoffman, 1924, Proc. Ia. Acad., *31*:441-442; Walker, 1924, Can. Ent., *56*:188; 1925, Uni. Toronto Stud., *26*:133; Garman, 1927, Conn. Geol. Surv. Bull., *39*:269, 273; Walker, 1927, Bull. Mus. Victoria:14; Kennedy, 1928, Ecology, *9*:375; Needham et al., 1928, Cornell Mem., *101*:55; Walker, 1928, Univ. Toronto Stud., *32*:44; 1929, Ent. News, *40*:243; 1932, Univ. Toronto Stud., *48*:244; 1933, Can. Ent., *65*:59-61, 70; 1933, Proc. N. S. Inst. Sci., *18*:110-111, 126-127; Williamson, 1933, Mich. Mus. Zool. Papers *264*: 1-5, pl.; Brown, 1934, Mich. Mus. Zool. Papers *291*:9; Walker, 1934, Rpt. Que. Soc. Prot. Pl., *26* (suppl.):11; Ahrens, 1938, Ent. News, *49*:13, 225-226; Buckell, 1938, Proc. Ent. Soc. Br. Col., *34*:61; Gloyd, 1939, Ent. News, *50*:12; Walker, et Ricker, 1938, Can. Ent., *70*:145-146, 150; Borror, 1940, Ent. News, *51*:78; Walker, 1940, Can. Ent., *72*:12, 33; 1941, Tr. Roy. Can. Inst., *23*:205, 210, 256-257; Montgomery, 1941, Proc. Ind. Acad., *50*:240; Whitehouse, 1941, Am. Midl. Nat. *26*:489, 550-552.

*Types*: ♂ holotype, ♀ allotype and 5 ♂ 3 ♀ paratypes—"Saskat. Scudder. F. C. Gray's Fund" (cited by Hagen, 1875, as "Saskatchewan, Southern Lake Winnipeg, British America"); ♀ paratype—"Minnesota", 2 ♀ paratypes—"Dacota. North Atle Cr. Dr. Mark."

*S. internum* is easily distinguished from *rubicundulum* (Say) which has a more deeply bifid (one-third or more of length) male hamule with the mesal face of the outer branch semi-elliptical, concave and shell-like and has the apices of the female vulvar lamina directed dorsad; it is also readily separated from the more closely related *obtrusum* which has the male hamule of similar shape (to that of *internum*) but less deeply bifid (one-fifth of length) and has the apices of the vulvar lamina of the female longer and contiguous.

A long series of specimens of this species from localities throughout the northern United States and Canada have been assembled for study and a detailed paper is in preparation.

GUELPH PRINTING SERVICE
Mailed Wednesday, March 31st, 1943